

Pairing SDR dongles with Windows 8.1 tablets

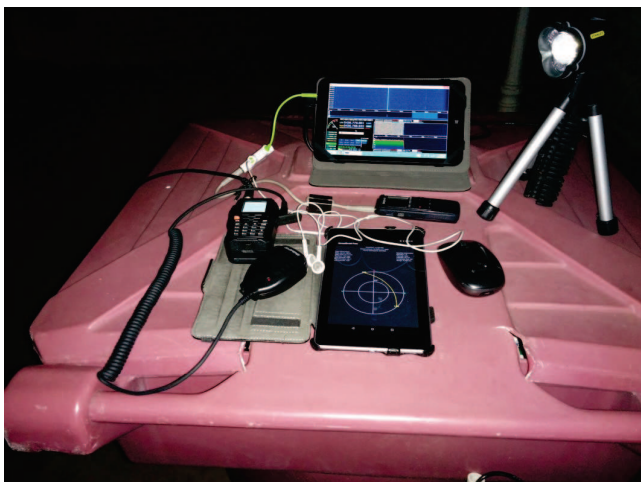
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Like many satellite operators, I occasionally work satellites using a FUNcube Dongle Pro+ USB dongle with HDSDR software. Although I enjoy being able to see the entire transponder on my screen, one problem for me has been that the laptop screen is hard to see in bright light in the field, requiring me to find a larger flat surface to accommodate the laptop along with my FT-817ND.

In late 2014, I solved the problem with a smaller (7- and 8-inch) Windows 8.1 tablet. Unlike many other tablets, these were effectively “real” computers, and affordably priced anywhere from \$50 to \$200. The smaller Windows 8.1 tablets are available from many different manufacturers and vendors. They share some common features:

- Limited memory (1 GB to 2 GB RAM);
- Limited internal storage, for the C: drive (16 GB to 32 GB);
- Limited capacity of micro SD card slot, for the D: drive (16 GB, 32 GB, or sometimes 64 GB);
- 2.4 GHz WiFi, and sometimes a 3G or 4G data modem;
- A 64-bit quad-core Intel CPU, but with a 32-bit version of Windows 8.1; and
- Some tablets have a single micro USB socket, while others have more USB ports and/or a micro HDMI port.

These tablets are like the netbooks of a few years ago, but with more limited capabilities. They are not intended to be replacements for larger tablets or laptops. Even



Wouxun, Tablet, and dongle for SO-50



so, I successfully have used an 8-inch HP Stream 8 tablet with my FUNcube Dongle Pro+ and the same software I run on my laptop for satellite operating. The advantage is that the SDR side of my satellite station is much more portable than with the laptop.

For many of these tablets with a single micro USB socket, a “USB On-The-Go” cable is required. The On-The-Go cable provides a standard USB socket, which can be used with any USB device like keyboards, mice, memory sticks, hard drives, and SDR dongles. These cables are inexpensive, usually priced around \$4 to \$5 each. Tablets with more USB sockets may not need the On-The-Go cable.

The tablet I bought was intended for use with Microsoft’s “cloud” (Internet-based) services. This may be fine for some, but I wanted to make the functionality as similar to my laptop as possible. I reconfigured the tablet so it would not require a Microsoft account to use, uninstalled some of those programs, and then proceeded to install the software I wanted. I purchased a 32 GB micro SD card, which stays in the tablet as the D: drive. I reconfigured some of the Windows folders like Documents, Downloads, etc., to use the D: drive instead of the C: drive.

I used the desktop mode of Windows 8.1 for installing programs like HDSDR (including the ExtIO DLL to support the FUNcube Dongle Pro+). This is similar to, but not exactly like, the desktop mode of Windows 7 and earlier versions. A “Classic Shell” program for Windows 8 systems provides a desktop similar to Windows 7, but I have not needed to install it on my tablet. The desktop mode in Windows 8.1 has been adequate for my needs.

A Bluetooth mouse has proven helpful when using HDSDR. The mouse wheel serves as a VFO knob, and sometimes the mouse is easier to use than pressing the tablet’s screen for some functionality. If I set up HDSDR with the parameters I want for the satellite I’m working, I can use it without the mouse in the field. Most of the time while working satellites, I just use the



*HSDR showing
AO-73 pass*

Bluetooth mouse with the tablet.

How well does the 8-inch tablet work with the FUNcube Dongle Pro+? I have had my tablet for a month and used it on many passes of AO-7, AO-73, FO-29, and SO-50. The tablet can handle the dongle and HSDR comfortably. For the transponder satellites, it is nice to see all of the transponder, making it easy to find the activity during a pass. For SO-50, HSDR's Automatic Frequency Control (AFC) function works for most of the pass, adjusting the receive frequency to compensate for Doppler without having to touch the mouse or tablet. The waterfall clearly shows the Doppler effect on the downlink signals, especially with SO-50's downlink.

The audio jack on the tablet is a standard 3.5mm (1/8") socket. Although I could rely on HSDR to record the audio I hear, along with the passband visible in the program, I still use a separate audio recorder for logging. I plug a Belkin Rockstar 5-way splitter into the audio jack, and connect my recorder with either earbuds or the earpiece from my Heil Traveler headset/mic into the splitter. The tablet has more than enough audio to drive both devices.

I use the Elk Antenna's handheld 2m/70cm log periodic. This antenna, with its single coax feedpoint, requires a diplexer if I use separate radios for transmit and receive. The diplexer also acts as a filter when working modes J or V/U, and I have never detected any issues with the dongle and tablet when transmitting from either an FT-817ND at 5 watts or an FT-897D at 5 to 15 watts.

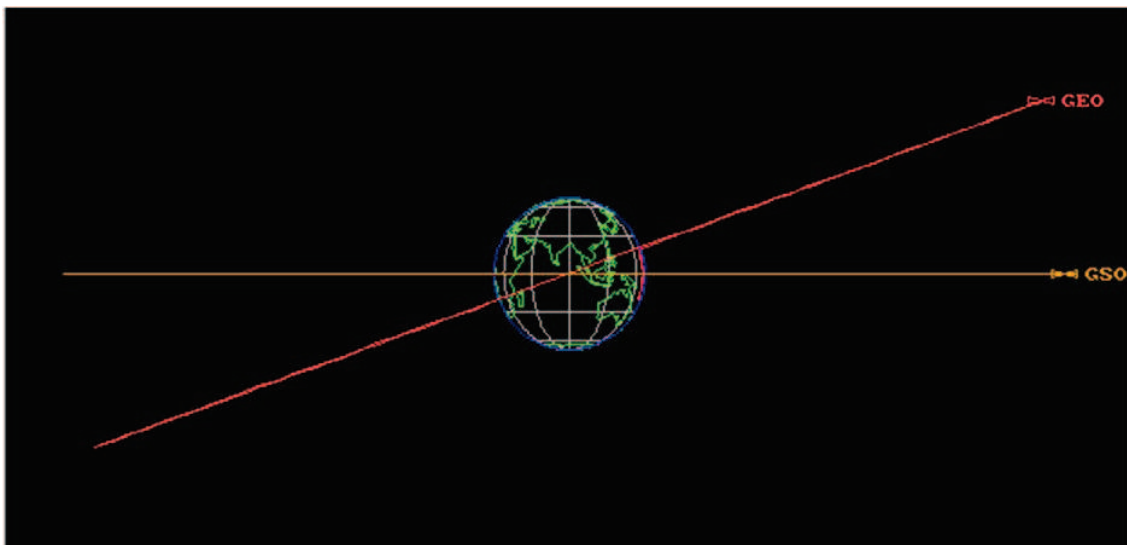
I sometimes still use a radio instead of a dongle when working satellites. For lower passes, the radio's receiver can be a little more sensitive than the dongle. If I am out in bright light, the displays on the radios are easier to see than the screen on the tablet. For most passes, however, I am now looking to use the tablet and dongle as my receiver for working FM or SSB/CW.

I have tried the SDR Sharp software on my tablet. It runs well, but I prefer HSDR for working satellites. It puts everything I want into a single window and is easier to control in the middle of a satellite pass. Other software related to satellite operating, like SatPC32 and the FUNcube Dashboard, run fine on the tablet.

I have also used the cheaper (around \$10 to \$30) R820T "RTL-SDR" USB dongles with the tablet. Other than having to load the driver to support this dongle, it also works well. For satellite operating, I prefer the FUNcube Dongle Pro+ and its front-end filtering for 2m and 70cm. For other receive-only uses, the 3 MHz bandwidth from the "RTL-SDR" dongles – compared to 192 kHz from the FUNcube Dongle Pro+ – comes in handy.

The FUNcube Dongle Pro+ makes a good alternative to using a satellite-ready transceiver – or two all-mode transceivers – for working SSB/CW and FM satellites. These smaller Windows 8.1 tablets, coupled with the dongles, make this a lot less expensive than in the past. And these tablets perform like their larger, laptop or desktop cousins.

73!



The transponder is expected to support a wide range of voice, digital, and experimental advanced communications technologies. A decision is expected soon specifying the microwave uplink and downlink bands.

Details of the precise orbit, location and operating frequencies have not yet been released but it seems likely that this bird will also use microwave frequencies so hang on to your various small dishes for the time being.

It has been reported that this spacecraft will not be in a geostationary orbit but rather in a geo-synchronous one.

Put simply this would mean that the spacecraft appears to move North and South over a period of some hours. This might mean that it will, for some periods at least, include the UK and Europe in its coverage area. This is for the moment all speculation of course.

The further good news is that AMSAT-VP, Drew, KO4MA, will like Peter, also be attending the Colloquium and has requested a slot to present about this project at the Colloquium so hopefully more information will be made available then. He will also be providing an update on the AMSAT-NA Fox series of CubeSats..

More on Tablets!

Following the example given by Patrick WD9EWK in his article on page 11, Graham, G3VZV, decided to see what was possible over here. After a quick visit to PC World he reports.

“The illustration shows an Linx tablet which runs Windows 8.1 and has an 8 inch display. It has just 1GB of RAM and a 32GB solid state hard disk. It was available at less than £90. As can be seen, the FUNCube Dashboard is completely compatible with this device. Both it and the FUNCube Pro+ Dongle work just fine together.”



We hear rumours of the Dashboard software having being ported to run on a Raspberry Pi. In the absence of any evidence to back these up however, it seems that these small Windows tablets are the smallest FUNCube ground-station decoders and displays that exist up to now! Unless, of course, you know differently